REMARKS

Applicants have carefully studied the nonfinal Examiner's Action mailed June 30, 2004 and all references cited therein. The amendment appearing above and these explanatory remarks are believed to be fully responsive to the Action. Accordingly, this important patent application is now believed to be in condition for allowance.

Applicants respond to the outstanding Action by centered headings that correspond to the centered headings employed by the Office, to ensure full response on the merits to each finding of the Office.

Oath/Declaration

Applicants herein enclose a copy of the XML-format declaration as electronically signed and submitted to the Office on September 23, 2003. A copy of the USPTO acknowledgement receipt indicating the file listing is also enclosed herein. Applicant has consulted with USPTO attorney Michael Lewis to confirm that XML-formal declarations are acceptable. A supplemental declaration was submitted on January 23, 2004 for Nidal A. Samad in order to correct Applicant's citizenship. Applicants herein enclose a copy of the supplemental declaration.

The office asserts that the declaration was not executed in accordance with either 37 C.F.R. 1.66 or 1.68.

37 C.F.R. §1.66 speaks to the formalities under which an oath must be made whereas §1.68 specifies that a declaration may be filed in lieu of an oath. The only requirements set forth by §1.68 are that the declarant be warned, on the same document, that willful false statements and the like are punishable by fine or imprisonment, or both and may jeopardize the validity of the application or any patent issuing thereon. The declarant must also set forth in the body of the declaration that all statements made of the declarant's own knowledge are true and that all statements have been made on information and belief and are believed to be true.

The declaration, which accompanied the filing of the application states:

> All statements made herein of own knowledge are true, all statements made herein on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001, and may jeopardize the validity of the application or any patent issuing thereon.

Accordingly, Applicants submit that a declaration in full compliance with 37 C.F.R. §1.68 was filed with the application and identified the application in accordance with MPEP §602, section VI < Identification of Application, and 37 C.F.R. §1.63. Applicants, respectfully request that the office withdraw the objection.

Drawings

Substitute drawings are provided herein to comply with the requirements of 37 C.F.R. §1.84(p)(4). Additionally, the amended specification is provided to reflect the change in reference numbers.

Claim Objections

The amendments to the claims, above, reflect the corrections requested by the office.
Claim 1, "waster" has been changed to -- waste--.
Claim 11, "1he" has been changed to -- The – (It is believed by Applicant that the character was changed as a result of the electronic filing of the application).
Claim 15, "The" has been changed to --A- - to reflect an independent claim.

Claim Rejections - 35 U.S.C. § 102

Applicant acknowledges the quotation of 35 U.S.C. § 102(b).

Claims 1-4 and 6-9 stand rejected under 35 U.S.C. § 102(b) as being anticipated by the '614 patent to Perslow. Reconsideration and withdrawal of this ground of rejection is requested in view of the amendments made to independent claim 1 and in view of these remarks explanatory thereof. Perslow, like all other references of record, neither teaches nor suggests Applicant's method of treating wastewater in a standard tank using a mixing loop.

U.S. Patent No. 6,132,614 to Perslow

The '614 describes a modular system for treating wastewater using plural tanks, including at least one reactor tank and one digester tank. The system comprises, generally, a wet well, a pump, a pair of reactor tanks (SBR's), an optional disinfection tank, and a temporary

sludge digester. The disinfection tank is preferably an ozone disinfection tank. (col.3, lines 23-29). The SBRs are preferably in the form of relatively large, elongated tanks. The tanks are elongated so that the wastewater entering the tanks at one longitudinal end travels through the a relatively long path in the tanks, and is therefore subjected to substantial processing. (col. 3, lines 47-54).

The SBR tanks of the '614 also require mixing pumps located inside the tanks for agitating wastewater within the tank, Additionally the SBRs must be equipped with at least one, preferably multiple, aeration manifolds made up of outlet nozzles and connections to an air source. (col. 3, lines 55-62). The '614 patent then describes the complex system whereby the mixing pumps must be connected to the respective aeration manifolds so that the wastewater can be mixed with the air and ejected through the outlet nozzles. (col.3, lines 62-67).

The Instant Application

Applicant's method of treating wastewater comprises multi-step process whereby waste water is treated on site and can be re-used for non-potable purposes. In the first step (Aerobic Step) the wastewater begins in a storage tank and enters a mixing loop, where it is mixed with air, or oxygen, thus ensuring that the bacteria remain in contact with the column of wastewater. The mixing loop can be any device that allows the introduction of a gas, here oxygen or air, and provides for the gas to be dissolved in water. Examples include a venturi followed by a static mixer or a simple bubble-diffuser and contact column. The water then reenters the holding tank.

The second step (Anaerobic Step) is a continuation of the biological filtration and is achieved anaerobically. The wastewater is passed through the same mixing loop but with without exposure to oxygen. It is in this step that the Nitrate-Nitrogen produced in the aerobic phase is reduced into Nitrogen and Nitrogen-oxide gases, which are released from the wastewater. After passing through the mixing loop the wastewater reenters the holding tank.

The third step is the settling step. The wastewater remains in the holding tank while the mixing loop operation is discontinued. The settling phase allows the bacteria, or biomass, to settle to the bottom of the tank creating a clarified supernatant water stratum.

The final step (Discharge Step) consists of disinfecting the supernatant water by injection it with ozone. If necessary the water can passed through a filter before being injected. Once the bacteria in the water are deactivated by the ozone exposure, the water is discharged for storage or

use. The ozonation process takes place in the ozonation block which, although similar, exists independently of the mixing loop.

The '614 patent does not provide a system or method which can be used with existing infrastructure.

The most striking distinction between the'614 patent and the instant invention is the makeup of the holding tanks. The tank which receives the wastewater in instant invention is substantially empty with regard to its internal structure. The '614 patent requires an elaborate tank containing gas distribution manifolds to be constructed in order to perform the mixing operations whereas Applicant's method can be adapted to any existing tank. Methods using gas distribution manifolds provide unequal distribution of gas through the manifolds yielding a non-uniform distribution of gas throughout the tank. This problem is exacerbated by the fact that the '614 patent requires an elongated tank. Once wastewater is collected in the holding tank, the water is mixed by entering a loop which takes the water outside the tank. Applicant respectfully draws the attention of the office to paragraph [0024] of the instant invention which states: "wastewater goes through pipe 40, then through the mixing block 50, through return pipe 60, and back to tank 30." It can therefore be seen how an existing tank, such as a pre-existing septic tank, can be retro-fitted to employ Applicant's method.

The '614 patent does not provide a system or method which can be adapted for use on mobile sources.

As previously mentioned, the '614 patent requires that the SBR be relatively large, elongated tanks. (col. 3, line 47). This requirement is largely due to the reaction process which happens within the tank. Since the agitation is created by a complex plumbing system within the tank, the size of the tank must be substantially increased to accommodate the internal apparatus. Furthermore, the '614 patent requires the use of a wet well, which comprises and additional tank which is, optimally, oversized to accommodate increasing quantities of waste water in subsequent phases. (col. 3, lines 35-38).

In contrast, the Applicant's method can easily be adapted to accommodate mobile sources, such as boats, planes, recreational vehicles and the like. [0005]. Since the tank of Applicant's method does not require any special apparatus to exist within the tank, any vessel

capable of holding the wastewater can be used (including those holding tanks already existing on such vehicles). The mixing loop, as well as the pumps which direct water flow there through, can be added to virtually any tank. Additionally, since the agitation occurs in the mixing loop, rather than the tank itself, Applicant's method does not require the use of an oversized wet well.

The '614 does not teach, describe, or suggest the use of a mixing loop.

Under current patent law anticipation requires that *each and every element of the claimed invention* be disclosed in the prior art.[1] Furthermore, in order for anticipation to be found the disclosure of each element of the under consideration must be found entirely within the single prior art reference.[2] The '614 patent, like all other references of record, neither teaches nor suggests Applicant's method of using mixing loops in conjunction with a holding tank to treat waste water. Accordingly, independent claim 1 has been amended to recite said method and therefore has not been anticipated by any reference cited by the Examiner.

For the reasons cited above, independent claim 1 is not anticipated by the '614 patent and is believed to be in condition for allowance. Claims 2-4 are dependent from independent claim 1, and are therefore allowable as a matter of law. Claims 6-9 are dependent from independent claim 11, and are therefore allowable as a matter of law.

Claim Rejections – 35 U.S.C. § 103

Applicant acknowledges the quotation of 35 U.S.C. § 103(a).

Claim 5, 10-11, and 13-14

Claims 5, 10-11, and 13-14 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the '614 patent.

Claims 5, 10-11, and 13-14 are dependent, directly or indirectly, upon claim 1, which has been previously shown to be allowable over the '614 patent. As such, claims 5, 10-11, and 13-14 are allowable as a matter of law.

---

[1] *Akzo N.V. v. U.S. International Trade Commission*, 1 USPQ 2d 1241, 1245 (Fed. Cir. 1986), *cert. denied*, 482 U.S. 909 (1987) (emphasis added)

[2] *W.L. Gore & Associates v. Garlock, Inc.*, 220 USPQ 303, 313 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984)

Claim 12

Claim 12 stands rejected 35 U.S.C. § 103(a) as being unpatentable over the '614 patent in view of U.S. Patent No. 4,304,665 to Hines. The Office asserts that it would have been obvious to one skilled in the art to have modified the method of the '614 patent by utilizing a mixing block in fluid communication with a mixing loop utilizing gas induction in order to, for instance, facilitate treatment of the water during variations in waste water flow, as suggested by the '665 patent.

Applicant respectfully traverses the rejection on the grounds that the office has not met its burden in establishing a *prima facie* case of obviousness.

The references cited do not provide any motive or suggestion to combine the separate elements.

The office asserts that it would have been obvious to one skilled in the art to combine the references to facilitate treatment of water during variations in waste water flow. To assert that the combination of the missing stuff elements in one reference arises from the nature of the problem to be solved implies a duty to show that this problem had been previously identified in the prior art.[3] Furthermore, obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching supporting the combination.[4]

The 665' patent describes a method and apparatus for treating wastewater by circulating the water around a specific structure comprising (a) a downcomer, and (b) a riser. The elements are connected at their lower end and the level of the waste water in the downcomer is necessarily above the level of the wastewater in the riser (thus establishing the hydrostatic pressure which cause circulation through the system). A gas, such as oxygen, can be alternately cycled through the system providing oxic and anoxic conditions.

---

[3] In re Zurko 111 F.3d 887 (Fed. Cir. 1997)

[4] *See* In re Geiger, 815 F.2d 686, 2 USPQ 2d 1276, 1278 (Fed. Cir. 1987). *See also* Diversitech Corp. v. Century Steps, Inc., 850 F.2d 675, 678-79, 7 USPQ 2d 1315, 1318 (Fed. Cir. 1988); In re Fritch, 23 USPQ 2d 1780, 1783–84 (Fed. Cir. 1992)"Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination. Under section 103, teachings of references can be combined *only* if there is some suggestion or incentive to do so." (quoting *ACS Hosp. Systems, Inc. v. Montefiore Hosp.*, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984)). . . . The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification.

The '665 patent was developed as a holistic water treatment system, rather than as an over-flow feature for existing systems. The '665 patent is a secondary, biological, treatment stage to be used in addition to a primary stage which includes physical filtration to remove large suspended solids. [col. 1, lines 11-17].

Discussions regarding variation in water flow begin in column 2, line 42 of the '665 patent:

> There may be occasional minor and temporary variations in the head h, caused for example by minor and temporary variations in the rate of flow of the wastewater around the apparatus, but these usually rectify themselves sufficiently rapidly to cause no undue disturbance of the flow pattern.

In col. 3, lines 17-33, the '665 patent continues:

> On the other hand, let us suppose that for some reason the wastewater flow rate starts to increase beyond its normal rate (e.g. if the supply at 6 is reduced or cut off altogether). In this case, the level A--A will begin to fall, with a corresponding decrease in the hydrostatic head h, until it reaches a new level C--C at which point the hydrostatic head is so reduced that the wastewater flow rate is slowed down again to its normal level. However, it takes time for the level to sink from A--A to C--C, particularly since the pump 3 is striving to maintain in the level A--A, and the more rapidly one can achieve this change in levels (i.e. the more rapidly one can achieve a reduction in the hydrostatic head h) the more rapidly the normal wastewater flow rate is restored. Once this has been done, the wastewater level will gradually rise from C--C to its normal level A--A.

A plain reading shows that although a problem has been identified by the '665 patent, *e.g.* variations in water flow, the reference merely identifies the problem within the confines of the '665 system. Nowhere in the reference is it suggested that the '665 system can be used in conjunction with another system to help accommodate variations in water flow.

Additionally, the '614 patent also identifies the problem associated with variations in water flow. As previously discussed, the '614 relies on the use of a wet well and an additional SBR unit to accommodate such fluctuations. In essence, both references teach away from the combination by providing solutions specific to their unique methods.

It is respectfully submitted that a *prima facie* case of obviousness has not been established and withdrawal of the objection is solicited.

Applicant's mixing loop significantly differs from that of the '665 patent.

As previously discussed, the '665 patent identifies a specific structure which relies on gravity to establish a hydrostatic pressure which moves water through the system. This pressure is generated by ensuring that the water in the downcomer stays above the level of the water in the riser. The pump used generates this pressure, by moving from a point past the riser to the downcomer, only when water is being recycled through the system. If the gradient is lost the system will not work. These requirements alone make the '665 patent unusable for a variety of situations, such as mobile uses which will affect the water level in the downcomer with respect to the riser.

Conversely, Applicant's system is not dependent on gravity to drive water through the mixing loop. Water is forced through the loop by the pump from the beginning. By placing a pump at the end of the loop (as done in the '665), it is required that a sufficient gradient exists prior to the pumps activation. Applicant's loop does not entail such physical limitations and can comprise any apparatus wherein water is cycled through the mixing block. So long as water exists in the holding tank, Applicants mixing loop can be activated.

Claim 15

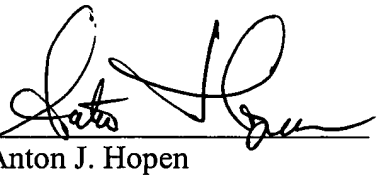
Claim 15 stands rejected under 35 U.S.C. §103(a) as being unpatentable over the '614 patent. As previously shown, Applicant's method is patentably distinct from the '614. In light of the foregoing, as well as the amendment to independent claim 15, it is believed the claim is now in condition for allowance.

Conclusion

Entry of a Notice of Allowance is solicited. If the Office is not fully persuaded as to the merits of Applicant's position, or if an Examiner's Amendment would place the pending claims in condition for allowance, a telephone call to the undersigned at (727) 507-8558 is requested.

Very respectfully,

SMITH & HOPEN

By: 

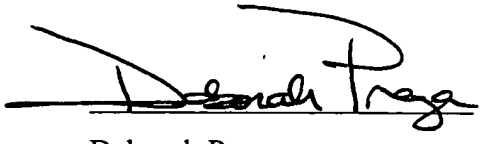
Dated: September 30, 2004

Anton J. Hopen
Suite 220
15950 Bay Vista Drive
Clearwater, FL 33760
(727) 507-8558
Attorneys for Applicants

CERTIFICATE OF MAILING
(37 C.F.R. 1.10)

I HEREBY CERTIFY that this Amendment A, including Amendments to the Specification, Amendments to the Claims, Amendments to the Drawings, and Remarks, is being deposited with the United States Postal Service in an envelope as "Express Mail Post Office to Addressee," mailing Label No. EV505918080US, addressed to: Mail Stop Amendment, P.O. Box 1450, Alexandria, VA 22313-1450 on September 30, 2004.

Dated: September 30, 2004



Deborah Preza

Amendments to the Drawings:

The attached sheets of drawings include changes to Figs. 2-12.

Attachment: Replacement Sheets

Annotated Sheets Showing Changes

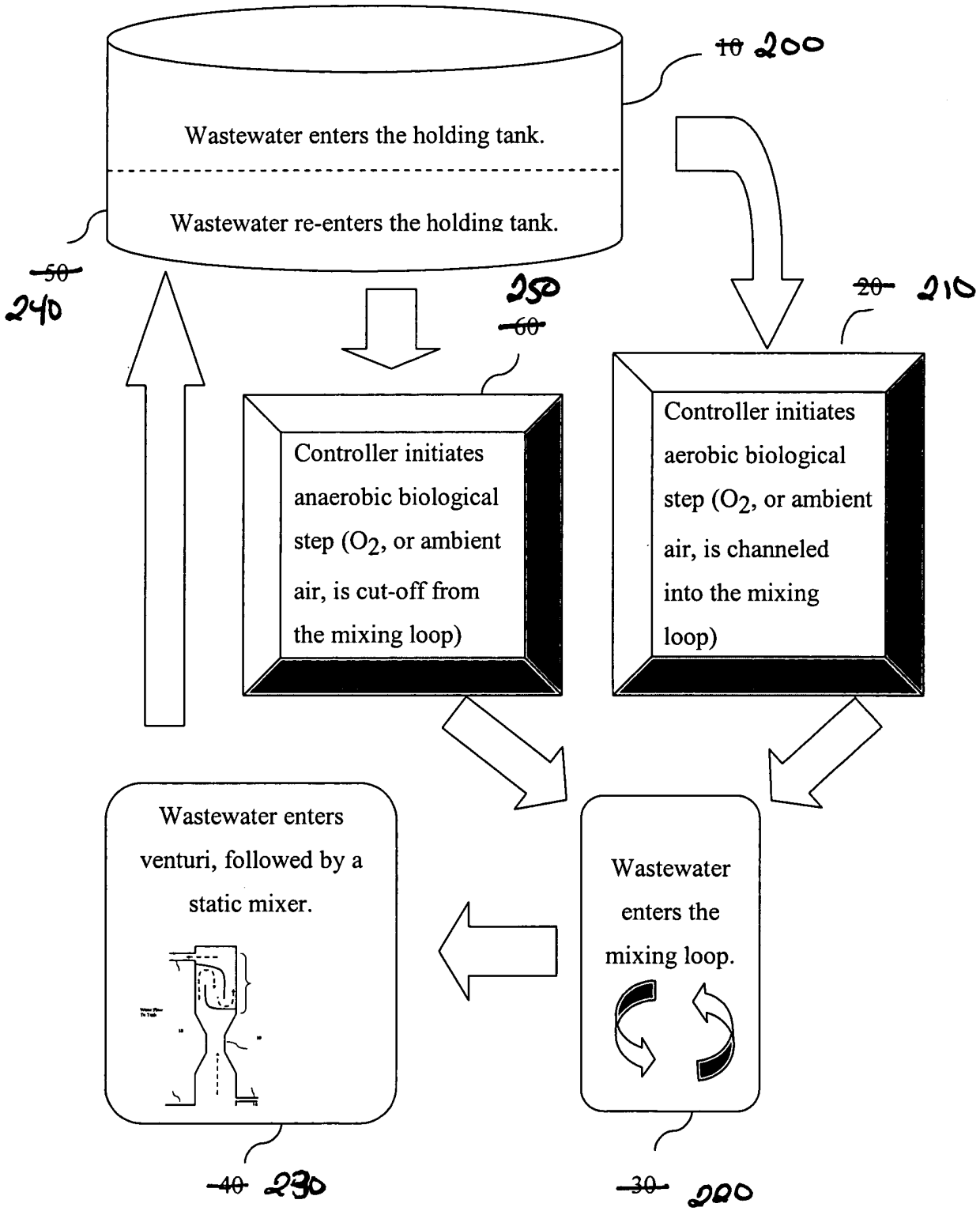


Fig. 2

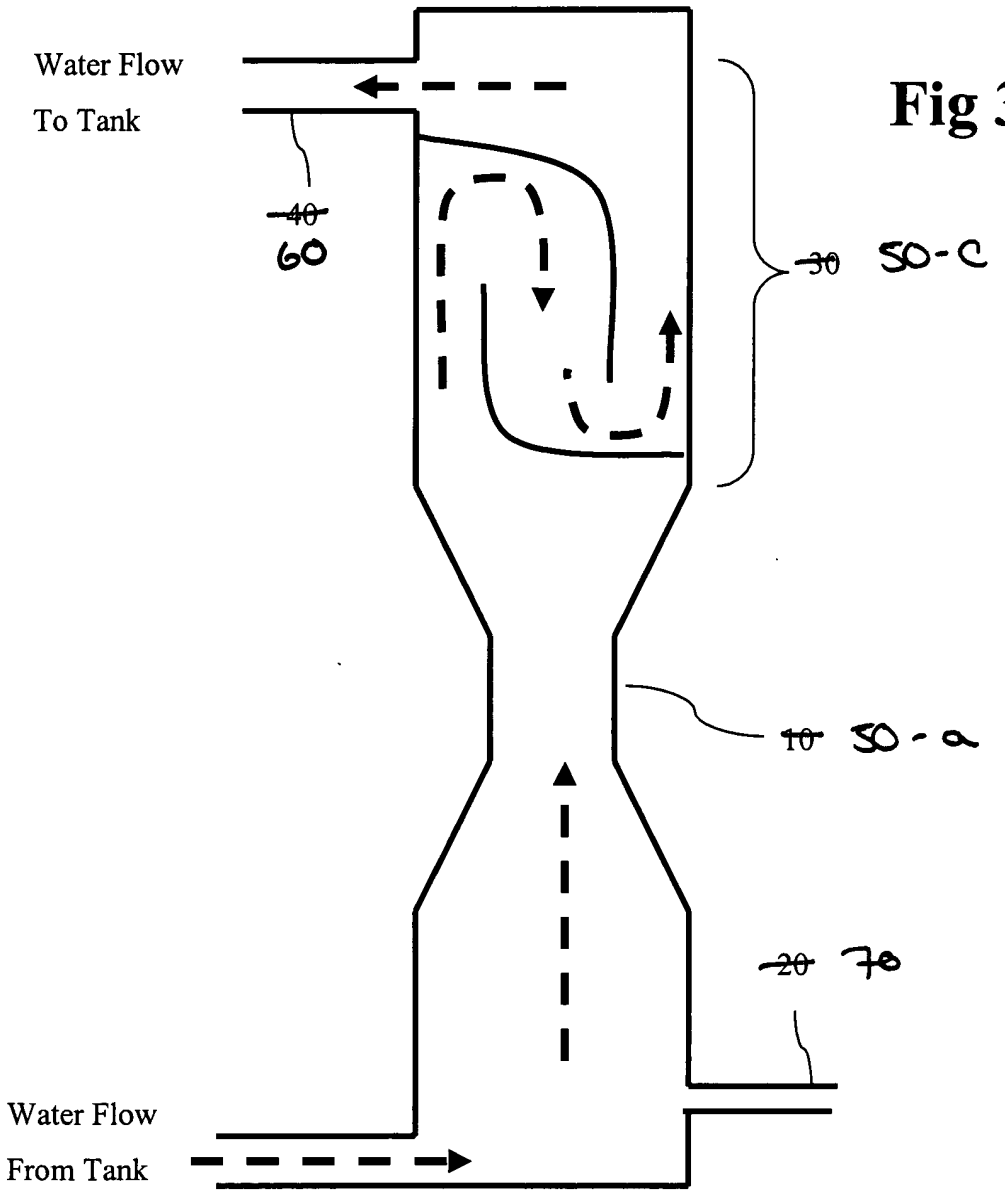
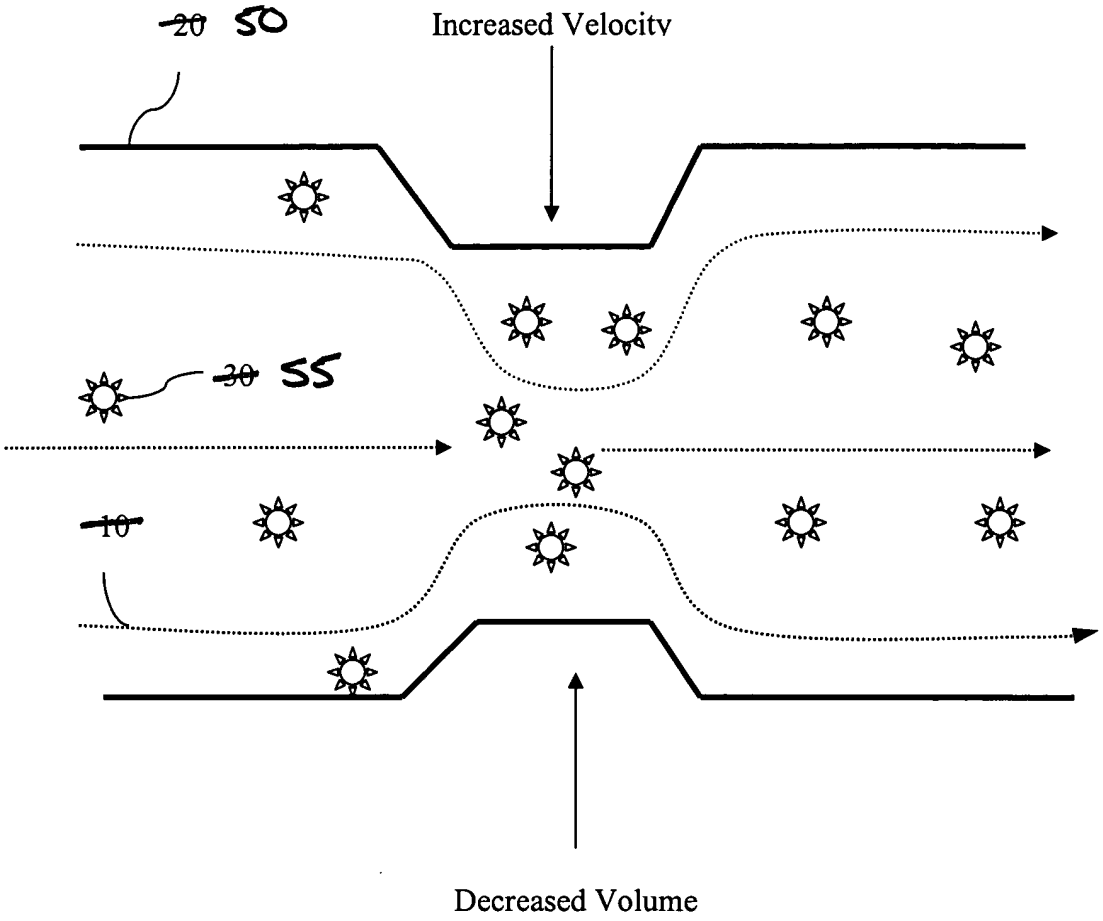


Fig 3.

Fig 4.



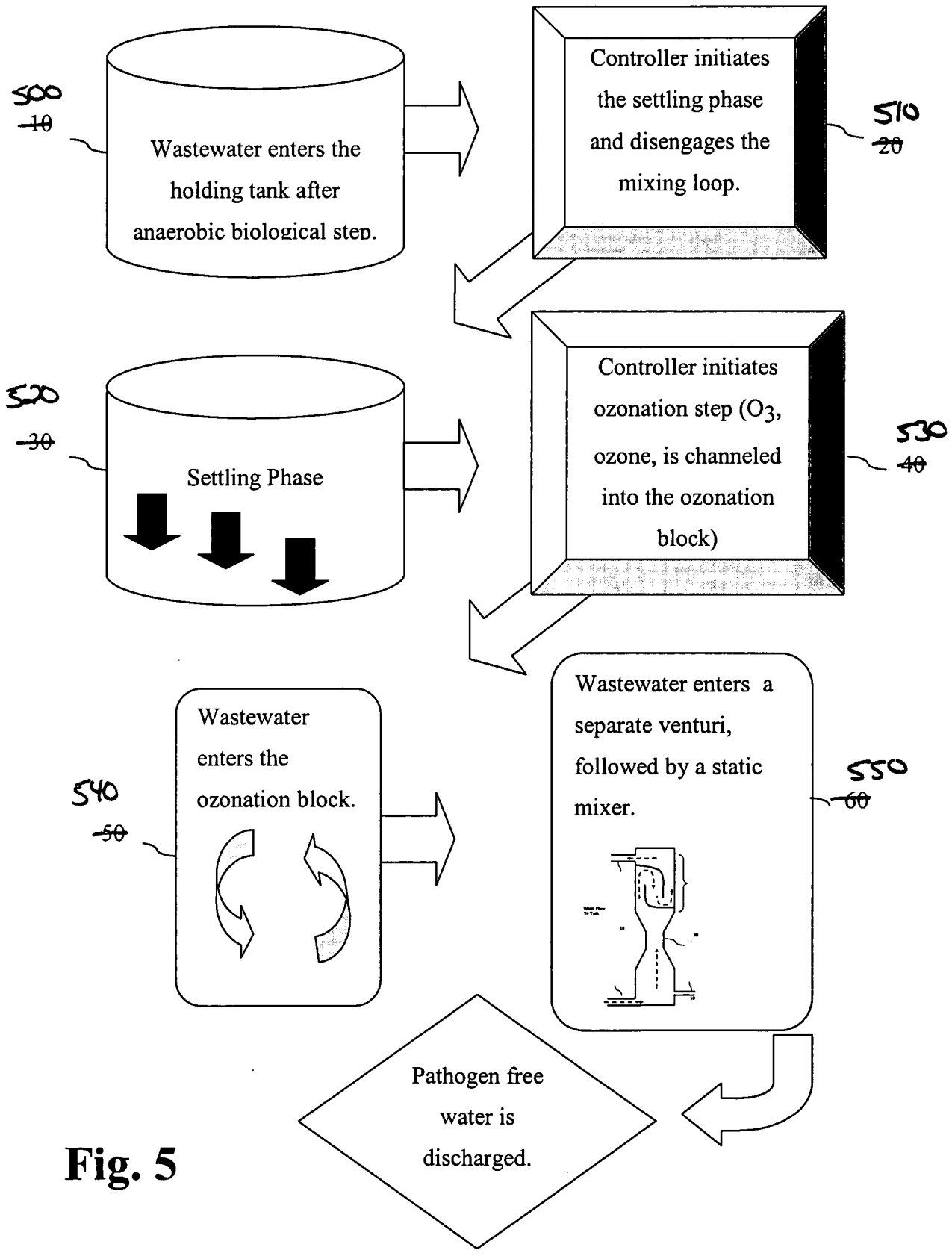

500
10
Wastewater enters the holding tank after anaerobic biological step.
Controller initiates the settling phase and disengages the mixing loop.
510
20
520
30
Settling Phase
Controller initiates ozonation step (O_3, ozone, is channeled into the ozonation block)
530
40
540
50
Wastewater enters the ozonation block.
Wastewater enters a separate venturi, followed by a static mixer.
550
60
Pathogen free water is discharged.

Fig. 5

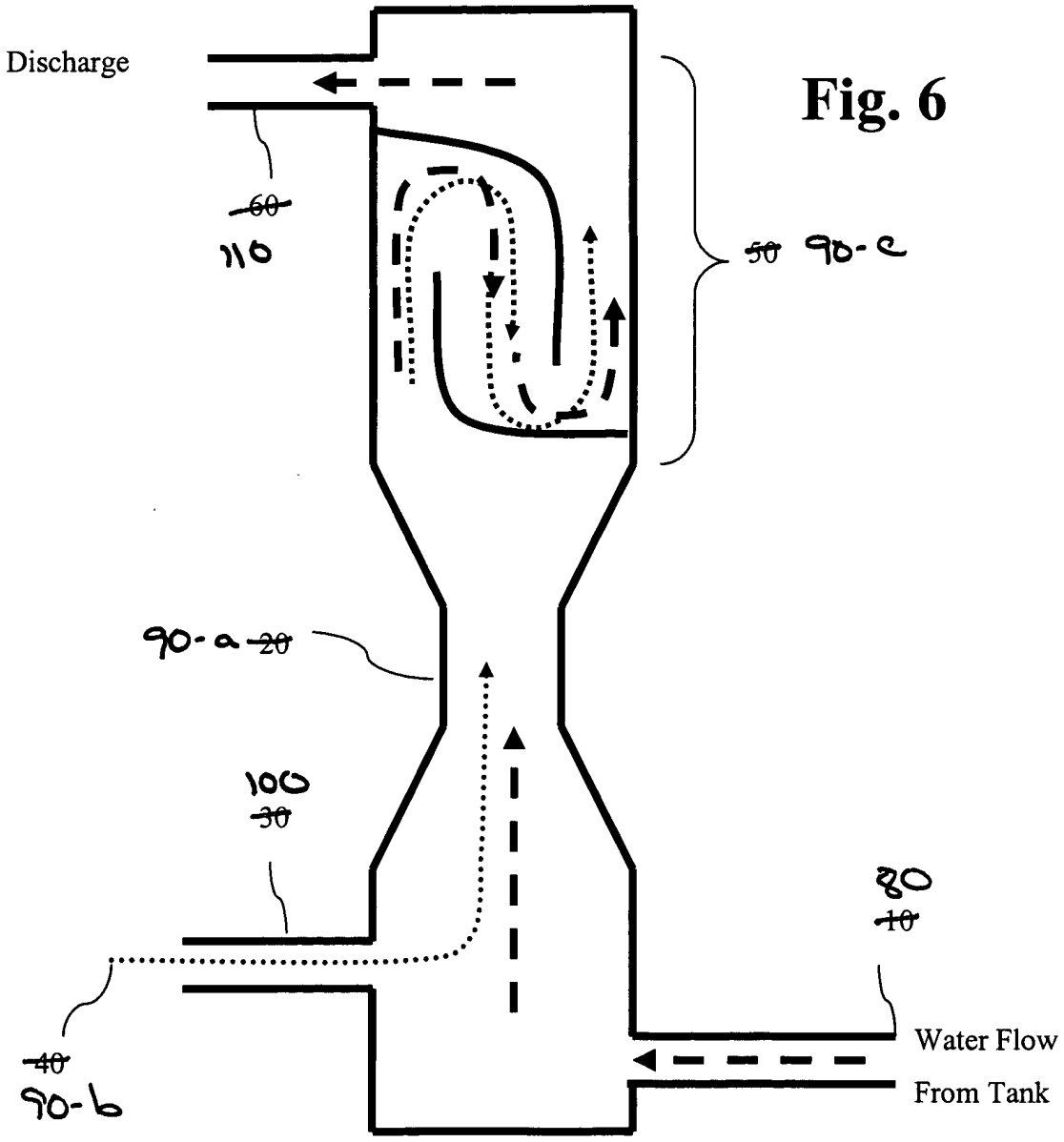

Discharge
~~60~~
110
~~50~~ 90-c
90-a ~~20~~
100
~~30~~
80
~~10~~
Water Flow
From Tank
~~40~~
90-b

Fig. 6

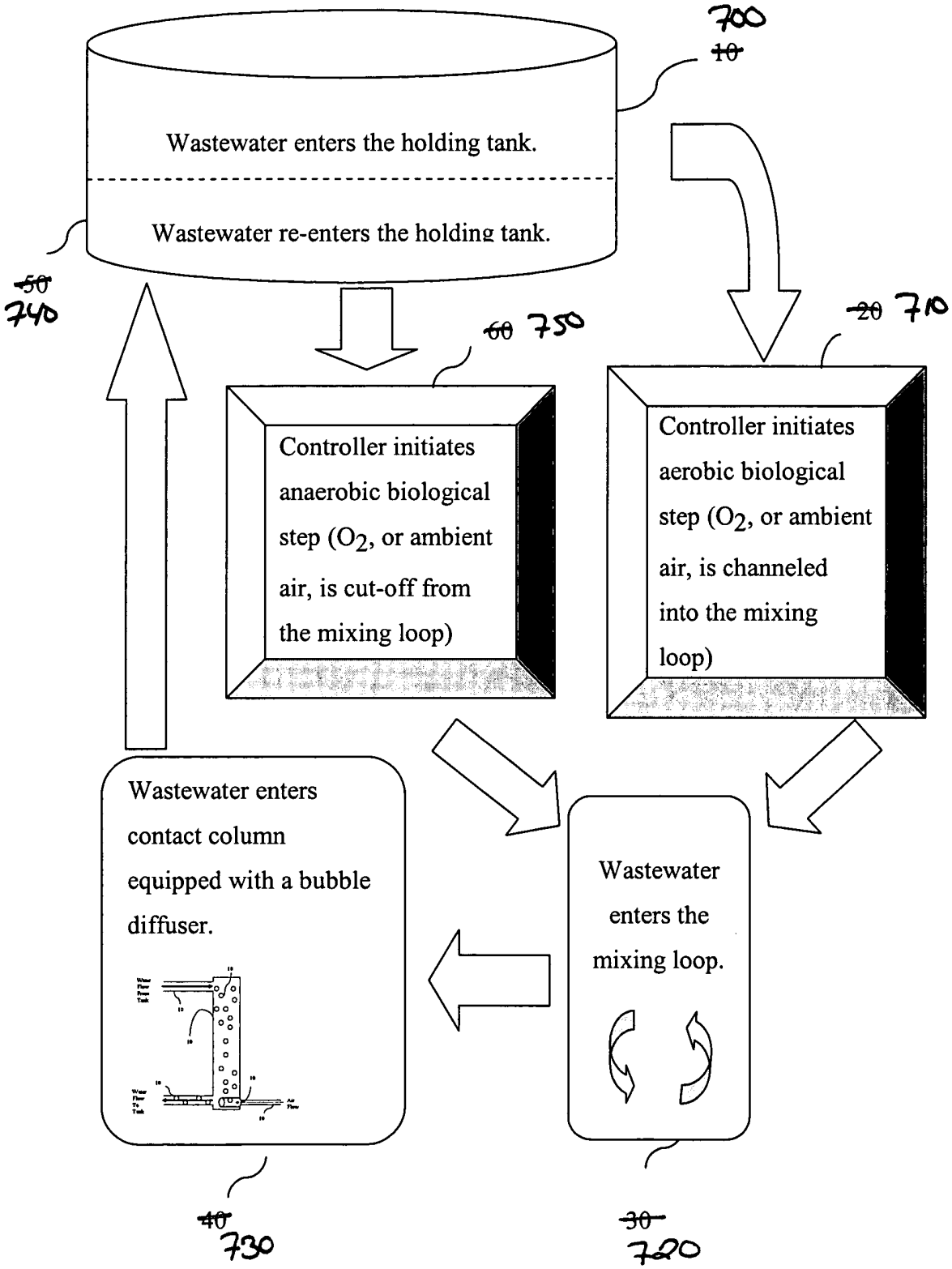

700
10
Wastewater enters the holding tank.
Wastewater re-enters the holding tank.
50
740
60
750
20
710
Controller initiates anaerobic biological step (O_2, or ambient air, is cut-off from the mixing loop)
Controller initiates aerobic biological step (O_2, or ambient air, is channeled into the mixing loop)
Wastewater enters contact column equipped with a bubble diffuser.
Wastewater enters the mixing loop.
40
730
30
720

Fig. 7

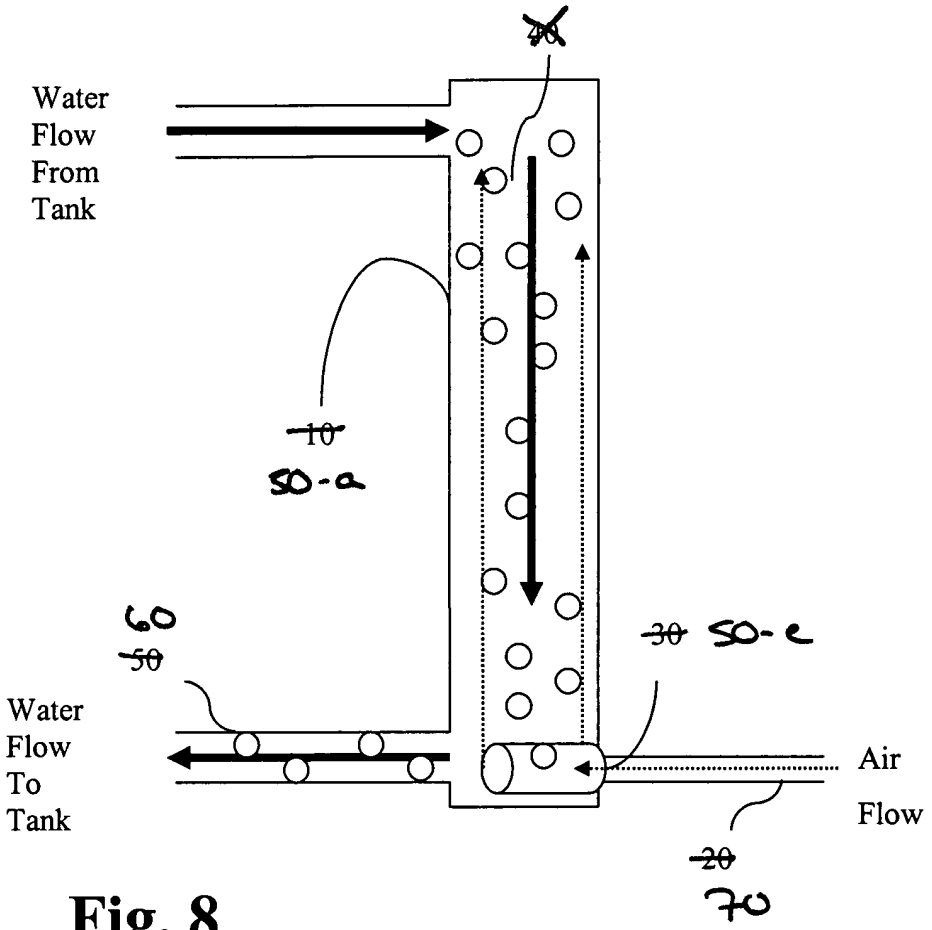

~~40~~
Water
Flow
From
Tank
~~10~~
50-a
60
~~50~~
~~30~~ 50-c
Water
Flow
To
Tank
Air
Flow
~~20~~
70

Fig. 8

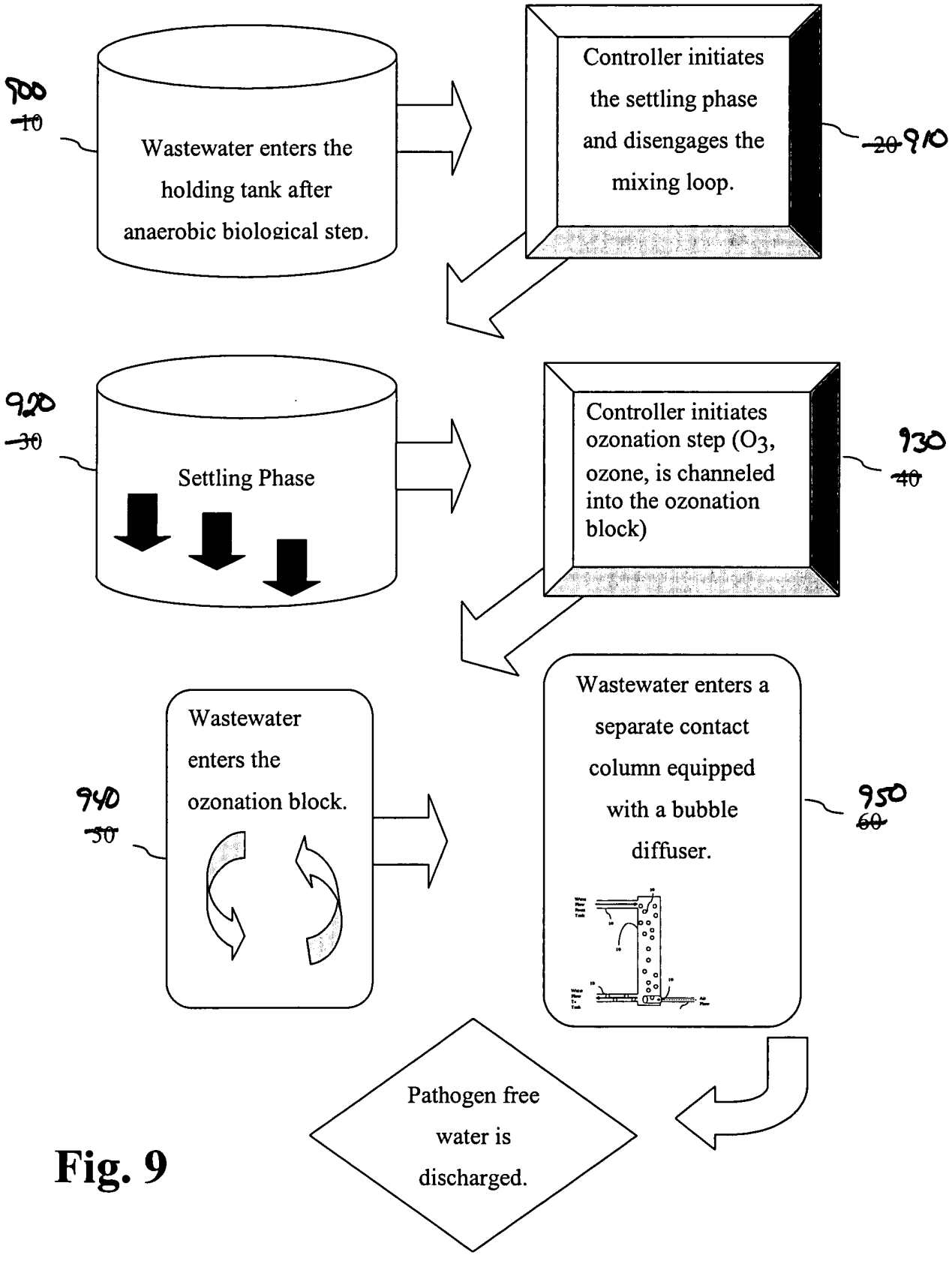

900
10
Wastewater enters the holding tank after anaerobic biological step.
Controller initiates the settling phase and disengages the mixing loop.
20
910
920
30
Settling Phase
Controller initiates ozonation step (O_3, ozone, is channeled into the ozonation block)
930
40
940
50
Wastewater enters the ozonation block.
Wastewater enters a separate contact column equipped with a bubble diffuser.
950
60
Pathogen free water is discharged.

Fig. 9

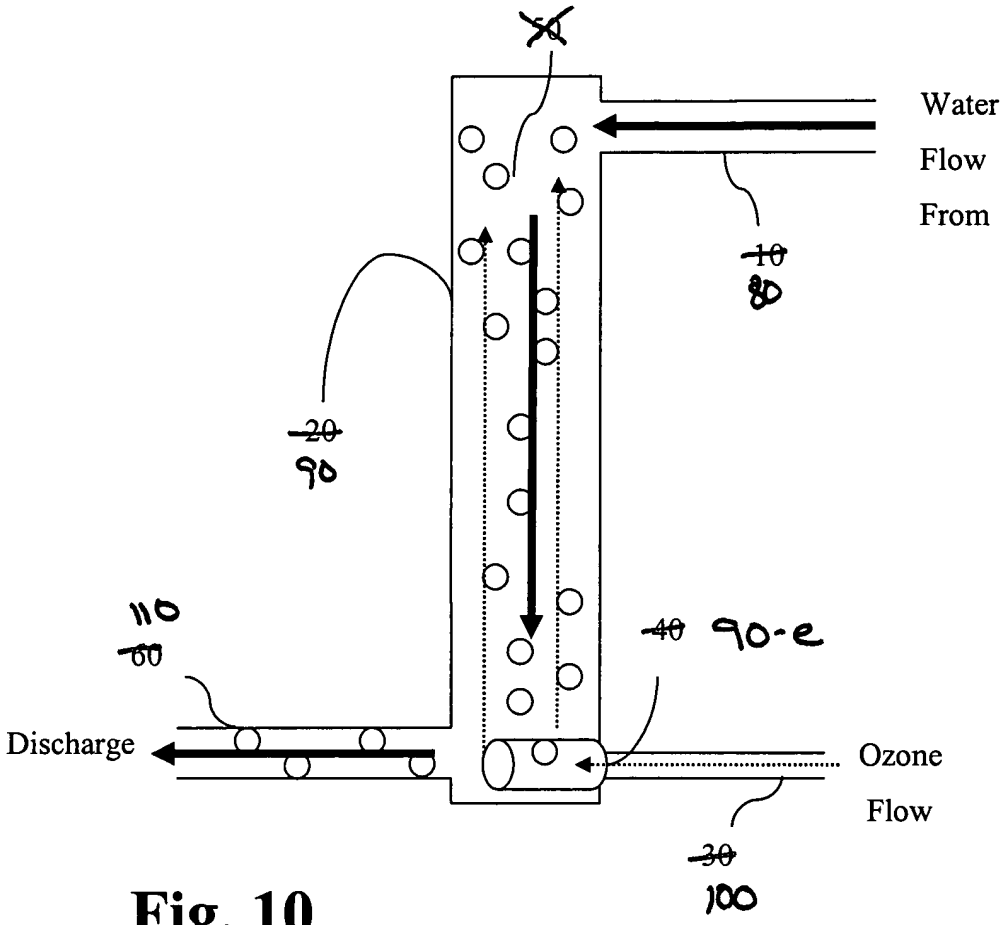

Water
Flow
From
10
80
20
90
110
60
40
90-e
Discharge
Ozone
Flow
30
100

Fig. 10

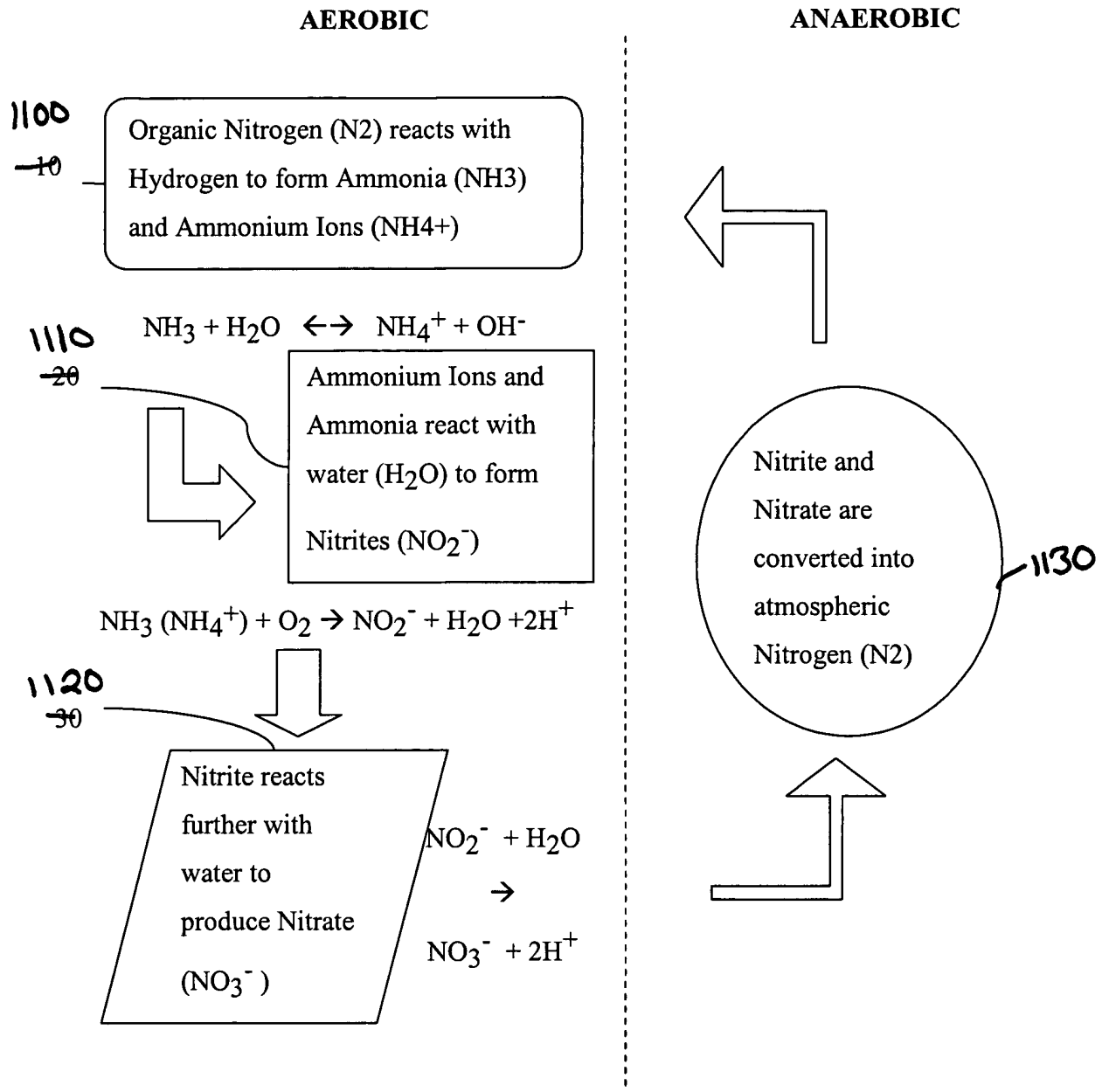

AEROBIC
ANAEROBIC
1100
10
Organic Nitrogen (N2) reacts with Hydrogen to form Ammonia (NH3) and Ammonium Ions (NH4+)
$NH_3 + H_2O \leftrightarrow NH_4^+ + OH^-$
1110
20
Ammonium Ions and Ammonia react with water (H_2O) to form Nitrites (NO_2^-)
$NH_3 (NH_4^+) + O_2 \rightarrow NO_2^- + H_2O + 2H^+$
1120
30
Nitrite reacts further with water to produce Nitrate (NO_3^-)
$NO_2^- + H_2O \rightarrow NO_3^- + 2H^+$
Nitrite and Nitrate are converted into atmospheric Nitrogen (N2)
1130

Fig. 11

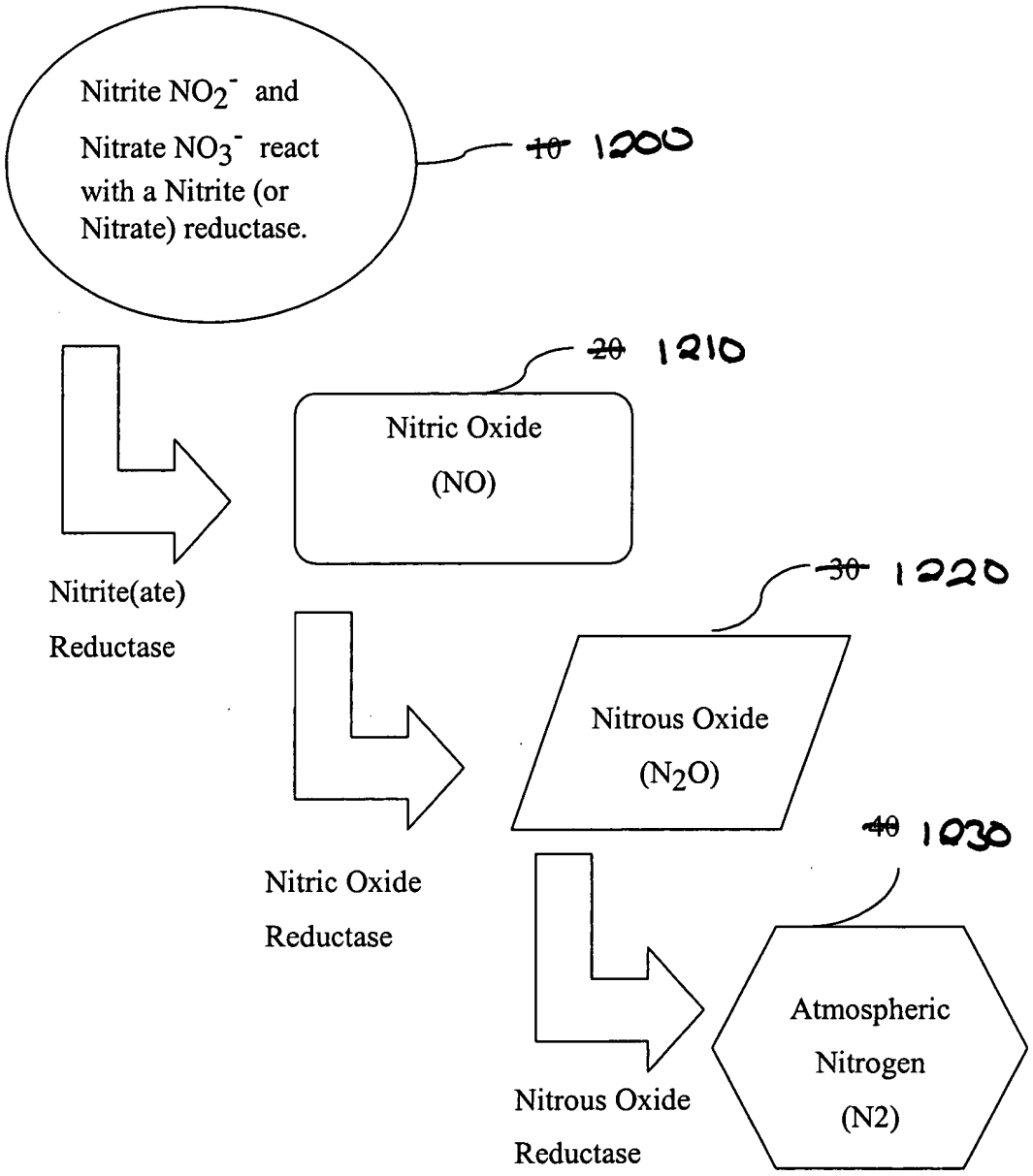

Nitrite NO_2^- and
Nitrate NO_3^- react
with a Nitrite (or
Nitrate) reductase.
~~10~~ 1200
~~20~~ 1210
Nitric Oxide
(NO)
Nitrite(ate)
Reductase
~~30~~ 1220
Nitrous Oxide
(N_2O)
Nitric Oxide
Reductase
~~40~~ 1030
Atmospheric
Nitrogen
(N2)
Nitrous Oxide
Reductase

Fig 12.